

LETTERS

RECOVERY OF PREY FROM WATER BY MERLINS

Shorebirds are important prey of Merlins (*Falco columbarius*) that winter at estuaries along the Pacific coast of North America. In California, Merlins generally attack shorebirds on the ground using a low stealth flight (G.W. Page and D.F. Whitacre 1975, *Condor* 77:73-83; B.E. Kus 1985, Ph.D. thesis, Univ. of California, Davis). In contrast, Merlins in Washington often stoop at Dunlin (*Calidris alpina*) flocks and then chase birds that become separated from the flock (J.B. Buchanan et al. 1988 *Wilson Bull.* 100:108-118). Nearly all of these hunting flights occur over water, although it is unclear why this is so. Shorebird flocks may engage in predator-evasion flight above water because this provides some unknown measure of safety from attack. However, when a bird becomes isolated from the flock, it is typically chased away from the flock and often further from shore (Buchanan et al. 1988). There are few records of Merlins recovering prey from water (B. Galloway 1981, *Brit. Birds* 74:264; D.A. Boyce, Jr. 1985, *Raptor Res.* 19:95-96; Buchanan et al. 1988). Our purpose here is to provide observations of this behavior and relate these to hunting behavior described for the region.

The observations reported below were made at Totten Inlet, Washington during a study of falcon-shorebird interactions during winter (Buchanan et al. 1988). Merlins regularly spend the winter at estuaries in western Washington, and in all cases their primary shorebird prey was the Dunlin (Buchanan et al. 1988), the most abundant wintering shorebird in western Washington estuaries (J.B. Buchanan 1988[a], *Western Birds* 19:69-78). A description of this estuary is provided in L.A. Brennan et al. (1985, *Murrelet* 66:11-16). Determinations of age and sex, when possible, and subspecies of Merlins, were based on S.A. Temple (1972, *Bird-Banding* 43:191-196) and F.L. Beebe (1974, Occas. Paper No. 17, B. C. Prov. Mus., Victoria, Canada).

We observed eight Dunlins landing in water 13 times during 10 hunting flights by Merlins, apparently as a final effort to avoid capture. Three Dunlins were recovered from the water by a Merlin (one of these Dunlins was involved in three consecutive hunting flights; see the first account below). Two other Dunlins were able to fly to safety and in three cases Dunlins were taken from the water by a Bald Eagle (*Haliaeetus leucocephalus*) or Glaucous-winged Gull (*Larus glaucescens*; see J.B. Buchanan 1988[b], *J. Raptor Res.* 22:63-64). Merlins made four capture attempts at Dunlins swimming in water, three (75%) of which were successful. Six of eight swimming Dunlins were captured by a Merlin or another bird. Our observations of successful capture of swimming Dunlins by Merlins are described below.

On 23 March 1981 a Dunlin isolated from a flock of about 3500 birds was chased by a Merlin (*F.c. columbarius*; age and sex undetermined). The Dunlin landed on the water five times, apparently to avoid capture. The Merlin hovered 7-8 m above the water after the Dunlin first landed and from that position stooped at the Dunlin when it attempted to fly, forcing it back to the water. The Dunlin took flight when two Glaucous-winged Gulls briefly chased it and the Merlin. The gulls discontinued their effort and the Merlin quickly resumed its pursuit. The Dunlin successfully dodged two capture attempts less than 1 m over the water, but on the third pass it again landed on the water. After the Merlin passed over, the Dunlin flew up from the water, but landed almost immediately when again stooped upon by the Merlin. After the Merlin swooped down and missed again, the Dunlin flew about 15 m and landed near some 4-5 m pilings in the water. The Dunlin appeared exhausted at this point and held its bill in the water while swimming 10 m to the base of the piling where the Merlin had landed. The Merlin flew 15 m to another piling and the Dunlin followed in flight, landing in water and staying within a few cm of the piling the Merlin had landed on. The Merlin flew out from the piling and looped back to make a low pass at the Dunlin and hovered at 3 m before swinging away. It returned in low flight and took the Dunlin off the surface of the water. This sequence of three hunting flights lasted 16 min (0842-0858 H).

On 19 November 1982 a Dunlin was forced into water by one of two Merlins (both were female *F.c. suckleyi*) that were simultaneously hunting a flock of about 2000 birds. One of the Merlins recovered the Dunlin and flew off. This hunting flight lasted less than 1 min, but occurred following several flights in the period 1205-1322 H.

On 24 March 1985 a Dunlin isolated from a flock of about 300 birds landed in water to avoid capture by a Merlin (*F.c. suckleyi*; age and sex undetermined). The Merlin hovered, then "parachuted" down toward the Dunlin three times. On the final try, the Merlin captured the Dunlin on the water. This hunting flight lasted less than 1 min.

During our study of falcon-shorebird interactions we found that significantly more chases of single Dunlins occurred low over water (Buchanan et al. 1988). Dunlins landed in water to avoid capture 13 times during 10 of 111 (9.0%) hunting flights. Merlins captured Dunlins on three hunting flights by grabbing the swimming birds from the water. Overall, 12% of the 25 successful flights we observed involved this type of capture. If we exclude stoops at flocks that

were successful on the first attempt ($N = 6$), 15.8% of all successful flights of extended duration involved recovery of Dunlins from water.

In California, Boyce (1985) observed that shorebirds landed in water to avoid capture by Merlins, Peregrine Falcons (*F. peregrinus*) and Northern Harriers (*Circus cyaneus*). In three of five instances shorebirds landed in water when chased by a Merlin, and then rejoined the flock as it passed overhead; two other swimming birds were captured. Based on this evidence, Boyce (1985) hypothesized that the shorebirds purposely landed in water to avoid capture (see also D. Dekker 1988, *Can. J. Zool.* 66:925-928). However, our data suggest that this is not commonly effective in western Washington. In fact, Merlins in Washington typically pursue isolated birds to areas of open water and away from the flock (Buchanan et al. 1988). We agree with Boyce (1985) that landing in water is most likely a purposeful attempt to avoid predation, although Merlins in Washington appear to benefit greatly from this evasion technique, as indicated by the success rate of capture attempts (75%) and the proportion of successful flights that involved this type of capture (12% of all flights; 15.8% of extended flights). In addition, 6 of 8 Dunlins that landed in water to avoid predation were either captured by a Merlin or another bird (see Buchanan 1988[b]). These data suggest that although landing in water is an option to avoid immediate predation, the likelihood of survival once in the water was low.

The magnitude of energetic costs associated with recovering swimming or floating prey is unknown. The mean weight of wintering Dunlins in western Washington is 51.0 g for males and 55.5 g for females (L.A. Brennan et al. 1984, *J. Field Ornithol.* 55:343-348). This is roughly $\frac{1}{3}$ to $\frac{1}{4}$ the weight reported for Merlins (males = 158 g, females = 213 g; N.F.R. Snyder and J. W. Wiley 1976, *Ornith. Monogr.* 20). Dunlins that land in water probably become slightly heavier as their plumage becomes soaked, and additional drag may be created for the Merlin when lifting the bird from the water. The significance of this assumed extra weight and drag is unknown, but such potential costs of recovering swimming prey may be offset if the Merlin is able to secure prey without engaging in full-powered or extended flight (e.g., the flights we describe above).

With the exception of the three cases described above, all captures of Dunlins by Merlins that we observed were made in mid-air (Buchanan et al. 1988), indicating that Merlins rarely knock prey to the ground or water in the manner of Peregrine Falcons (D.A. Ratcliffe 1980, *The Peregrine Falcon*, Buteo Books, Vermillion, SD). Despite this tendency for mid-air capture, our small sample of observations indicates that Merlins have little trouble lifting Dunlins from the water.

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